

**What is claimed:**

- 5 1. A method for hydrogen sulphide and/or mercaptans decomposition, said method comprising passing hydrogen sulphide and/or mercaptans containing gas at a temperature lower than 200°C through a layer of a solid material capable to decompose hydrogen sulphide and/or mercaptans with isolation of hydrogen or hydrocarbons and formation of sulfur containing compounds on the surface of the material, **characterized** in that said solid material is placed in the layer of a liquid phase substance.